IMPROVED OPTICAL MECHANISM OF AN OPTICAL MOUSE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an improvement of a mouse mechanism and, more particularly, to an improved optical mechanism of an optical mouse.

2. Description of Related Art

In typical optical mouse techniques, the operation principle essentially determines motions of an optical mouse by judging an uneven or micro-scraggy surface of a use plane (for example, a desk surface or a mouse pad).

With reference to FIGS. 1 and 2, a typical optical mechanism is implemented inside an optical mouse 5 in which the reflecting light is schematically shown. The typical optical mechanism includes a light device 51, a light guiding device 52 and a photosensor 53. The light guiding device 52 has a first lens 521, a second lens 522, a first prism 523, a second prism 524 and a cavity 525. The light device 51 emits an incident light I_2 to the first lens 521. The incident light I_2 is then reflected by the first prism 523 and the second prism 524 to pass through a bottom opening 50 of the optical mouse 5 and project on a reflective plane 6. Because the reflective plane 6 is uneven, a reflecting light R_2 formed after the incident light I_2 reaches the reflective plane 6 will be scattered and repeatedly reflected between the cavity 525 and the reflective plane 6. In this case, the reflecting light R_2 to the second lens 522 is guided to the photosensor 53 for judging the status of

the plane 6 and thus determining motions of the optical mouse 5.

However, in the cited optical mechanism, because the reflecting light R_2 is repeatedly reflected between the cavity 525 and the reflective plane 6, the photosensor 53 receives not only the reflecting light R_2 firstly reflected by the reflective plane 6 but also light repeatedly reflected. Accordingly, light contrast is reduced so that the optical mouse 5 does not easily determine existence of uneven or micro-scraggy in the reflective plane 6.

Therefore, it is desirable to provide an improved optical mechanism to mitigate and/or obviate the aforementioned problems.

SUMMARY OF THE INVENTION

An object of the present invention is to provide an improved optical mechanism of an optical mouse, which significantly presents uneven or micro-scraggy features of a use plane to increase the image-determining performance of the optical mouse.

Another object of the present invention is to provide an improved optical mechanism of an optical mouse, which uses an illumination technique to produce relatively high light points to increase light-and-shade contrast.

To achieve the objects, the improved optical mechanism of an optical mouse of the present invention is implemented inside the optical mouse with a bottom opening. The improved optical mechanism includes a light device, a light guiding device, a photosensor and an absorbing layer. The light device provides an incident light. The light guiding device guides

the incident light to pass through the bottom opening and thus project on a reflective plane. The photosensor implemented in the optical mouse above the bottom opening receives a reflecting light generated on the reflective plane by reflecting the incident light. The absorbing layer coated and attached on a surface around the photosensor absorbs reflecting light not directly projected to the photosensor.

Other objects, advantages, and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cross-section of a typical optical mouse interior;

FIG. 2 is a schematic diagram of imaging formed by incident light in an optical mechanism of the typical optical mouse;

FIG. 3 is a cross-section of an optical mouse interior according to an embodiment of the invention;

FIG. 4 is a cross-section of a light guiding device of FIG. 3; and

FIG. 5 is a schematic diagram of imaging formed by incident light in the optical mechanism according to the embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to FIGS. 3 to 5, an embodiment of the invention is shown. FIG. 3 shows an optical mouse 1 with a bottom opening 10. An optical mechanism is implemented inside the optical mouse 1. The optical mechanism includes a light device 11, a light guiding device 12, a photosensor 13 and an absorbing layer 14. The light device 11 is preferably

a light emitting diode (LED) die or the like. The absorbing layer 14 is preferably a black coating directly coating/attaching on a surface required to absorb light. Of course, a surface processing can be applied to the surface to form the absorbing layer 14.

As shown in FIG. 3, the light device 11 emits incident light I_1 parallel to the reflective plane 2. The incident light I_1 is projected just onto a first lens 121 of the light guiding device 12 for focusing. After focusing, a first prism 123 and a second prism 124 reflect the incident light I_1 such that the incident light I_1 is accurately guided to pass through the opening 10 and finally projected on the reflective plane 2. It is noted that the light device 11 can be implemented above the light guiding device while the light guiding device is appropriately adjusted in design to advantageously receive the incident light I_1, and further guide and project the incident light I_1 onto the reflective plane 2. Of course, the light device 11 can be implemented obliquely inside the optical mouse 1, in order to advantageously project the incident light directly (or after a lens focuses) on the reflective plane 2.

Because the reflective plane 2 is finely uneven or micro-scraggy, a plurality of beams of reflecting light R_2 are produced and reflected to different directions.

In FIG. 4, the inventive absorbing layer 14 is coated/attached on surface of a cavity 125 of the light guiding device 12 adjacent to a second prism 124. With reference to FIG. 5 in combination with FIG. 4, it is shown that several beams of reflecting light R_1 not directly projected to the second lens 122 are absorbed by the absorbing layer 14 coated/attached on surface

of the cavity 125, so no reflection appears again. Meanwhile, remaining beams not absorbed by the absorbing layer 14 of reflecting light R_1 to the second lens 122 are focused and projected to the photosensor 13. At this point, the photosensor 13 can receive relatively high light points by such an illumination technique and accordingly increase light-and-shade contrast, i.e., high light points become brighter and low light points become darker. Further, micro-scragginess on the reflective plane 2 is significantly presented and thus the performance of determining images of the optical mouse 1 is increased.

For the optical mechanism implemented inside the optical mouse 1, an opening of the cavity 125 faces directly to the bottom opening of the optical mouse 1 and the second lens 122 is coaxially implemented with the photosensor 13. In addition, because reflecting light R_1 reaches the surface of the cavity firstly, the absorbing layer 14 is coated/attached to the surface of the cavity 125. If the reflecting light R_1 is not projected to the surface of the cavity 125 as the light guiding device 12 or other mechanism in the optical mouse 1 is improved, the absorbing layer 14 is coated/attached to a surface firstly contacted by the reflecting light R_1, generally to the surface adjacent to the surroundings of the photosensor 13. Thus, it is ensured that several beams of the reflecting light R_1 not directly projected to the photosensor 13 can be absorbed completely by the absorbing layer 14.

Although the present invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit

and scope of the invention as hereinafter claimed.